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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,959	06/23/2003	Chang-Hyeon Lee	050324-1321	8906
24504	7590	04/15/2004	EXAMINER	
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 100 GALLERIA PARKWAY, NW STE 1750 ATLANTA, GA 30339-5948			CUNNINGHAM, TERRY D	
			ART UNIT	PAPER NUMBER
			2816	

DATE MAILED: 04/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/601,959

Applicant(s)

LEE ET AL.

Examiner

Terry D. Cunningham

Art Unit

2816

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 13-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Summary of changes in this action*

- I. The indefiniteness rejection concerning a “first reference signal” and a “second reference signal” has been withdrawn responsive to Applicant showing support for such in the specification.

### *Drawings*

While new Fig. 3B is acceptable to overcome the previous drawing objection, Figs. 3A and 3B are further objected to being unclear. The specification discloses element 36 as being filter. However, the present combination for element 360 will not operate. Element 363 is an N-channel transistor having its drain/source terminals connected to the Vb/Vb1 terminal and the Vcn terminal and having its gate connected to ground. With this connection, transistor 362 will always be off. It appears that Figs. 3A and 3B should be change such that either 1) the drain and source of transistor 362 be connected together or 2) the conductivity types of transistors 362 and 364 be exchanged.

The drawings are also objected to as the conductivity types shown in Figs. 3A and 3B must necessarily be incorrect. Firstly, if transistor 310-316 are N-channel, as shown, they cannot possibly operate as current mirrors. Clearly, transistors 310-316 would necessarily have to be P-channel transistors to operate as current mirrors. Secondly, if transistor 318-320 are P-channel, as shown, they cannot possibly operate as differential pairs. Clearly, transistors 318-320 would necessarily have to be N-channel transistors to operate as differential pairs. And thirdly, if transistor 326-328 are P-channel, as shown, they cannot possibly operate as tail current source transistors (to bias the differential pairs). With the conductivity type shown, transistors 326 and 328 would operate as source followers. Clearly, transistors 326-328 would necessarily have to be N-channel transistors to operate as current mirrors.

Examiner notes that the only way that the circuit of Figs. 3A and 3B can operate with the connections shown is to exchange the VDD and ground connections.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

The specification is objected to for improperly identifying the conductivity types and drain and sources of the transistors shown in Figs. 3A and 3B. Reference is made to the above objection to the drawings. The specification is objected to for reasons as the drawings.

### ***Claim Objections***

Claims 1-11 and 13-38 are objected to for improperly identifying the conductivity types and drain and sources of the transistors shown in Figs. 3A and 3B for similar reasons as discussed above.

Appropriate corrections for the above discussed objections are required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-11, 13-25, 28 and 29 are rejected under 35 U.S.C. § 112, first paragraph, as based on a disclosure which is not enabling. The "phase and frequency detector", the "loop filter", the "voltage controlled oscillator" and the "current controlled oscillator" is deemed critical

or essential to the practice of the invention, but is not included in the claim(s). An arrangement lacking this feature is not enabled by the disclosure since it cannot be understood from the specification how the circuit will operate without such. *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 and 13-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, in lines 16-18, there is no support found for the “first and second output nodes” or the “output signals”. As seen in Figs. 3 and 5, the circuit only has one output providing one signal Vcp.

Examiner has fully considered Applicant’s remarks for the above rejection and has not found them to be persuasive. Examiner acknowledges terminal Vcn of Figs. 3A and 3B, however, such would not be reasonably considered to be an “output” of the “charge pump” as claimed. As seen, Vcn is the output of the filter which is connection to one of the “reference signal” Vb.

Claims 2-11 and 13-27 are rejected as including the indefiniteness discussed above with claim 1.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 10, 11, 13-24, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (USPN 5,889,437). Lee discloses, in Fig. 7, a circuit comprising: “a first input stage” having “a first input transistor (M41)”, “a first complementary transistor (M42)”, “a first discharging transistor (M45)” and “a charging transistor (M47)”; “a first control signal (UP)”; “a first reference signal ( $\overline{UP}$ )”; “a second input stage” having “a second input transistor (M43)”, “a second complementary transistor (M44)”, “a second discharging transistor (M46)” and “a charging transistor (M50)”; “a second control signal (DN)”; “a second reference signal ( $\overline{DN}$ )”; and “a loop filter (R1, C1, C2)”, all connected and operating similarly as recited by Applicant.

With respect to claims 28 and 29, clearly the above circuit to Lee will provide the recited method.

Examiner has fully considered Applicant's remarks for the above rejection and has not found them to be persuasive. Applicant argues concerning the “drain” and the “source” terminals of the transistors. However, the circuit cannot have the connections discussed for the

reasons discussed above. Further, with respect to Applicant's remarks concerning the "reference signal". However, it is notoriously well known that the complement of a signal can reasonably be considered a reference for that signal. It appears Applicant is giving too much limitation to the "reference signal".

Claims 30, 32 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawasaki (USPN 5,955,904). Kawasaki discloses, in Fig. 4, a circuit comprising: "a first transistor pair, comprising a first switching transistor (50) and a first complementary transistor (51)", all connected and operating similarly as recited by Applicant.

Claims 1-11 and 13-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Qu (USPN 6,292,061, cited by Applicant). Qu discloses, in Fig. 3, a circuit comprising: "a first input stage" having "a first input transistor (left-most transistor, receiving F2 at the gate)", "a first complementary transistor (second from left-most transistor, receiving XO at the gate)", "a first discharging transistor (left-most transistor receiving vn1 or vn2)" and "a charging transistor (left-most diode-connected transistor on top)"; "a first control signal (dn, received via transistor having its drain connected to F2)"; "a first reference signal (XO)"; "a second input stage" having "a second input transistor (third from left-most transistor, receiving F1 at the gate)", "a second complementary transistor (fourth from left-most transistor, receiving XO at the gate)", "a second discharging transistor (transistor receiving XD at the drain)" and "a charging transistor (transistors coupled between XA and Vdd)"; "a second control signal (up, received via transistor having its drain connected to F1)"; "a second reference signal ( $\overline{DN}$ )"; "a voltage divider (series of resistors and transistor between vss and vdd)"; and "a loop filter (RFILTER1, REFILTER2, C1F1, C2F1, C1F2 AND C3F2)".

With respect to claims 26 and 27, reference is further made to Fig. 2 of Qu which discloses a phase lock loop circuit comprising a phase and frequency detector (105)"; and "a voltage-to-current converter (120)".

With respect to claims 28 and 29, clearly the above circuit to Qu will provide the recited method.

With respect to claims 30-38, the above circuit to Qu discloses, in Fig. 4, a circuit comprising: "a first transistor pair" having "a first switching transistor (left-most transistor, receiving F2 at the gate)", "a first complementary transistor (second from left-most transistor, receiving XO at the gate)", "a first current source (left-most diode-connected transistor on top)" and "a first current sink (left-most transistor receiving vn1 or vn2)"; "a first control signal (dn, received via transistor having its drain connected to F2)"; "a constant bias voltage (XO)"; "a second transistor pair" having "a second switching transistor (third from left-most transistor, receiving F1 at the gate)", "a second complementary transistor (fourth from left-most transistor, receiving XO at the gate)"; and "a first cascode transistor pair (first cascode pair from left connected to vdd)", all connected and operating similarly as recited by Applicant.

Examiner has fully considered Applicant's remarks for the above rejection and has not found them to be persuasive. Again, contrary to Applicant's remarks, it is notoriously well known that the complement of a signal can reasonably be considered a reference for that signal.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**



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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terry Cunningham whose telephone number is 703-308-4872.

The examiner can normally be reached on Monday-Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy P. Callahan can be reached on 703-308-4876. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is 703-308-0956.

TC  
April 13, 2004

  
Terry D. Cunningham  
Primary Examiner  
Art Unit 2816